WHAT IS CLAIMED IS:

1. A fiber optic gyroscope in which a light beam from a light source is sequentially passed through an optical fiber and an optical fiber coupler to be incident on a substrate-based optical integrated circuit having the function to serve as a polarizer and having a branching optical waveguide;
light beams which are branched by the optical integrated circuit are made to be incident on the opposite ends of a single mode fiber optic coil as a clockwise rotating beam and a counter-clockwise rotating beam; the clockwise rotating beam and the counter-clockwise rotating beam which have propagated through the fiber optic coil are coupled together in the optical integrated circuit to produce an interference therebetween; the interference beam is introduced from the optical fiber coupler to a light receiver in order to convert the light intensity into an electrical signal; and the electrical signal is used to detect an angular rate applied to the fiber optic coil about the axis thereof; further comprising

a first polarization maintaining optical fiber connected between the optical fiber coupler and the optical waveguide of the optical integrated circuit and having an polarization axis coincident with the direction of the TE mode in the optical waveguide, the first optical fiber having a length L1;

a second and a third polarization maintaining optical fiber connected to remaining two end faces of the optical waveguide of the optical integrated circuit at respective one end, respectively, where the polarization axis is coincident with the direction of the TE mode in the optical waveguide, the second and the third optical fiber having a length of L2 and L4, respectively;

and a fourth and a fifth polarization maintaining optical fiber connected to the other end of the second and the third polarization

maintaining optical fiber, respectively, at respective one end where the polarization axis of the connected fibers are displaced by an angle of 45°, the other ends of the fourth and the fifth optical fiber being connected to the opposite ends of the fiber optic coil, the fourth and the fifth optical fiber having a respective length of L3 and L5;

the optical fibers disposed between the light source and the optical integrated circuit except for the first polarization maintaining optical fiber being all constructed with single mode optical fibers;

denoting the length which is required to produce a group delay time difference between orthogonal polarizations of each of the polarization maintaining optical fibers which is in excess of the coherence length of a light beam from the light source by L, the fiber lengths satisfying the following requirements:

$L1 \geq L$, $L3 \geq L$, $L5 \geq L$

$|(L1+L2)-L3| \geq L$, $|(L1+L4)-L5| \geq L$

$||(L1+L2)-L3| - |(L1+L4)-L5|| \geq L$.

2. A fiber optic gyroscope according to Claim 1, further satisfying the following requirements:

$|L1-L3| \geq L$, $|L1-L5| \geq L$

$||L1-L3|-|L1-L5|| \geq L$.

3. A fiber optic gyroscope according to Claim 1, further satisfying the following requirements:

$L2 \geq L$, $L4 \geq L$,

$||L1-L2|-L3| \geq L$

$||L1-L4|-L5| \geq L$

$|||L1-L2|-L3|-||L1-L4|-L5|| \geq L$.

4. A fiber optic gyroscope according to Claim 3, further satisfying the

following requirements:

$L2 \geq L$, $L3 \geq 4L$, $L4 \geq 4L$, $L4 \geq 8L$, $L5 \geq 16L$.

5. A fiber optic gyroscope in which a light beam from a light source is sequentially passed through a polarization maintaining optical fiber and a polarization maintaining optical fiber coupler to be incident on a substrate-based optical integrated circuit having the function to serve as a polarizer and having a branching optical waveguide; light beams branched by the optical integrated circuit are made to be incident on the opposite ends of a single mode fiber optic coil as a clockwise rotating beam and a counter-clockwise rotating beam; the clockwise rotating beam and the counter-clockwise rotating beam which have propagated thorough the fiber optic coil are coupled together in the optical reintegrated circuit to produce an interference therebetween; the interference beam is introduced from the optical fiber coupler into a light receiver to convert the light intensity into an electrical signal; and the electrical signal is used to detect an angular rate applied to the fiber optic coil about the axis thereof; further comprising

a second and a third polarization maintaining optical fiber connected to remaining two end faces of the optical waveguide of the optical integrated circuit at respective one end where the polarization axis of the second and the third optical fiber is coincident with the direction of the TE mode of the optical waveguide, the second and the third optical fiber having a respective length of L2 and L4;

and a fourth and a fifth polarization maintaining optical fiber which are connected to the other end of the second and the third polarization maintaining optical fiber, respectively, at their respective one end where the inherent axes are displaced by an angle of 45° from each other, the other ends of the fourth and the fifth optical fiber being connected to the opposite ends of

the fiber optic coil, the fourth and the fifth optical fiber having a respective length of L3 and L5;

denoting a length required to produce a group delay time difference between orthogonal polarizations in each polarization maintaining optical fiber which is in excess of the coherence length of a light beam from the light source by L, the fiber lengths satisfying the following requirements:

$L3 \geq L$, $L5 \geq L$, $|L3-L5 \geq L$.

6. A fiber optic gyroscope according to Claim 5, further satisfying the following requirements;

$|L2-L3| \geq L$, $|L4-L5| \geq L$

$||L2-L3|-|L4-L5|| \geq L$.